

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A photoelectrochemical system for the cleavage of water to hydrogen and oxygen by visible light ~~consisting of two~~ comprising first and second superimposed top and bottom photocells, ~~both the~~ cells being connected electrically, ~~characterized in that the~~ a photoactive material in the top cell is being a semiconducting oxide placed in contact with an aqueous solution, ~~said the~~ oxide absorbing the a blue and green part of the solar emission spectrum to generate oxygen and protons from water and transmitting the a yellow and red part of the solar emission spectrum light to ~~a second~~ the bottom photocell mounted behind the top cell and composed of a ~~dye-sensitized~~ dye-sensitized mesoporous photovoltaic film, said bottom cell converting the ~~yellow, yellow and red parts~~ and a near infrared ~~portion part~~ of the ~~sunlight~~ solar emission spectrum to drive the reduction of the protons, produced in the top cell during the photo catalytic water oxidation process, to hydrogen.

Claim 2 (currently amended): A photoelectrochemical system for the direct cleavage of water to hydrogen and oxygen by visible light according to claim 1, ~~consisting of 1~~ comprising two superimposed photocells, both cells being connected electrically, wherein the photoactive material present in the top photocell is a thin film of WO_3 or Fe_2O_3 deposited on a conducting substrate or conducting glass and placed in contact with an aqueous electrolyte solution, said WO_3 tungsten oxide or Fe_2O_3 iron oxide absorbing the blue and green part of the solar emission spectrum to generate oxygen and protons from water and transmitting the yellow and red light to a the bottom photocell mounted behind the top photocell and composed of a ~~dye sensitized~~ dye-sensitized photovoltaic film, said second photocell converting the yellow, red and near infrared ~~portion parts~~ of the solar emission spectrum to drive the reduction of the protons, produced in the top photocell during the water oxidation process, said reduction of protons to hydrogen gas taking place in an electrolyte compartment mounted behind the bottom

photocell and being separated from the top photocell compartment where oxygen is evolved by a glass frit or an ion conducting membrane.

Claim 3 (currently amended): A photoelectrochemical system according to claim 1, characterized in that the photoactive oxide material present in the top cell is a doped form of Fe_2O_3 Fe_2O_3 , the dopant being selected from the elements Si, Ge, Sn, Pb, Ti, ~~Zr~~, Zr, Hf, Sb, Bi, V, Nb, Ta, Mo, ~~Fe~~, Tc and Re or F, Cl, Br and I.

Claim 4 (currently amended): A photoelectrochemical system according to claim 1, characterized in that the photoactive Fe_2O_3 Fe_2O_3 in the doped or undoped form is present as a smooth layer, said layer having a thickness between 50 nm and ~~5000 nm~~ 5000 nm, said layer transmitting light of wavelength above 600 nm.

Claim 5 (currently amended): A photoelectrochemical system according to claim 1, characterized in that the sensitizer is a ruthenium polypyridyl complex chosen from $\text{RuL}_2(\text{NCS})_2$ $\text{RuL}_2(\text{NCS})_2$ and $\text{RuL}'(\text{NCS})_3$ $\text{RuL}'(\text{NCS})_3$, where $\text{L} = 4,4'$ -dicarboxy-2,2'-bipyridine $\text{L} = 4,4'$ -dicarboxy-2,2'-bipyridine and $\text{L}' = 4,4',4''$ -tricarboxy-2,2',6',2''-terpyridine $\text{L}' = 4,4',4''$ -tricarboxy-2,2',6',2''-terpyridine.

Claim 6 (previously amended): A photoelectrochemical system according to claim 1, characterized in that the oxygen and hydrogen evolution reaction take place both in the top cell and/or in separated compartments, said compartments being connected by an ion conducting membrane or a glass frit.

Claim 7 (currently amended): A photoelectrochemical system according to claim 1, characterized in that the hydrogen evolution is catalyzed by a metal, chosen from Ni, Pt, Pd, Ru, Rh and ~~Ir, or~~ Ir, or alternatively by a polyacid or heteropolyacid chosen from tungsten, vanadium and molybdenum, said catalyst being deposited in the form of a thin coating on the cathode of the cell.

Claim 8 (previously amended): A photoelectrochemical system according to claim 1, characterized in that seawater is used as a source for hydrogen and oxygen in the water cleavage or water splitting device.